Comparisons of Satellite Soil Moisture, an Energy Balance Model Driven by LST Data and Point Measurements

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Soil moisture plays a fundamental role in the partitioning of mass and energy fluxes between land surface and atmosphere, thereby influencing climate and weather, and it is important in determining the rainfall-runoff response of catchments; moreover, in hydrological modelling and flood forecasting, a correct definition of moisture conditions is a key factor for accurate predictions.

Different sources of information for the estimation of the soil moisture state are currently available: satellite data, point measurements and model predictions. All are affected by intrinsic uncertainty. Among different satellite sensors that can be used for soil moisture estimation three major groups can be distinguished: passive microwave sensors (e.g., SSMI), active sensors (e.g. SAR, Scatterometers), and optical sensors (e.g. Spectroradiometers). The last two families, mainly because of their temporal and spatial resolution seem the most suitable for hydrological applications

In this work soil moisture point measurements from 10 sensors in the Italian territory are compared of with the satellite products both from the HSAF project SM-OBS-2, derived from the ASCAT scatterometer, and from ACHAB, an operative energy balance model that assimilate LST data derived from MSG and furnishes daily an evaporative fraction index related to soil moisture content for all the Italian region. Distributed comparison of the ACHAB and SM-OBS-2 on the whole Italian territory are performed too.